

**Abstract**

**[0091]** The selection of multiple, suitably designed, demodulation reference signals can enable the measurement of a vehicle's speed using continuously transmitted frequency modulated (CTFM) signals. The unique solution of vehicle speed can be used to resolve the range Doppler ambiguity found in conventional CTFM sonar and radar systems. This can enable continuous range and speed estimates of high-speed vehicles with an attendant reduction in transmit power relative to pulse-echo systems with similar measures of performance due to the 100% duty cycle.